

LUBINELLA, A NEW GENUS OF ULOBORIDAE (ARACHNIDA, ARANEAE)

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ABSTRACT

The new genus *Lubinella* from New Guinea is described and illustrated and its relationship discussed.

INTRODUCTION

Owing to its prominent eye tubercles, the new genus *Lubinella* appears upon first examination to be related to *Sybota* and *Orinomana*. However, the presence of a single pair of female spermathecae and of a male palpal femoral tubercle and median apophysis bulb unite this genus with *Uloborus*, *Zosis*, *Purumitra*, *Octonoba*, *Conifaber*, *Ponella*, *Philoponella*, and *Daramuliana*. The synapomorphy of numerous, small, abdominally restricted tracheoles unites *Lubinella* most closely with the latter seven genera. The presence of a weakly sclerotized conductor homolog (or vestigial conductor) arising from the center of the median apophysis bulb (Figs 10, 11) is an apomorphic feature shared with *Zosis*, *Purumitra*, *Octonoba*, and *Conifaber*. Yoshida (1980, 1981, 1982) shows that, like *Lubinella*, many *Octonoba* species lack a tegular spur on the male palpus. For this reason, *Lubinella* appears most closely allied with *Octonoba*. Several *Octonoba* species have an anterior median epigynal lobe which may have extended posteriorly, fusing with the lateral lobes to form the paired crypts and posterior extension characteristic of *Lubinella*.

The web of *Lubinella* has diverged from the horizontal orb-web which appears to be characteristic of *Octonoba* species (Yoshida 1980, 1981). Although this asymmetrical web is still a horizontal or sloping orb, its smaller hemisphere is situated nearer a substrate retreat and incorporates a vacant sector through which one or several signal lines extend (species F, Lubin, in press). Opell (in ms) suggests that eye tubercles of *Lubinella*, like those of *Hyptiotes* and *Miagrammopes* may accompany carapace muscle reorganization associated with monitoring a single (signal) line. As in *Miagrammopes*, these tubercles may also extend or otherwise shift the visual field of *Lubinella*. The posterior eyes of *Lubinella* are proportionally larger and their lenses more protuberant than those of the eight genera with which it is most closely allied.

Another striking feature of the genus is the male's apparent use of a groove near the apex of the narrow cymbium (arrows, Figs. 8, 11) as an embolus guide. Although a

similar function has been suggested for the broad cymbial lobe of *Tangaroa* species (Opell 1979, 1983), *Lubinella* is the only uloborid group with a distinct cymbial groove in which the apically directed embolus can lie. As a result of critical-point-drying the embolus shown in Figs. 10 and 11 pulled away from the palp's apical region. Both prior to preparation and upon return to alcohol the embolus tip was adjacent to cymbial tip and median apophysis spur as shown in Fig. 8. Examination of an expanded palp indicates that the apically-curved distal embolic region rests in the cymbial groove, its outward movement perhaps restricted by the protruding tip of the vestigial conductor. The flattened, twisted median apophysis spur appears to hook under the epigynum's posterior rim, securing the palpus and allowing the reduced median apophysis bulb to articulate with one of the epigynal crypts.

Lubinella, new genus

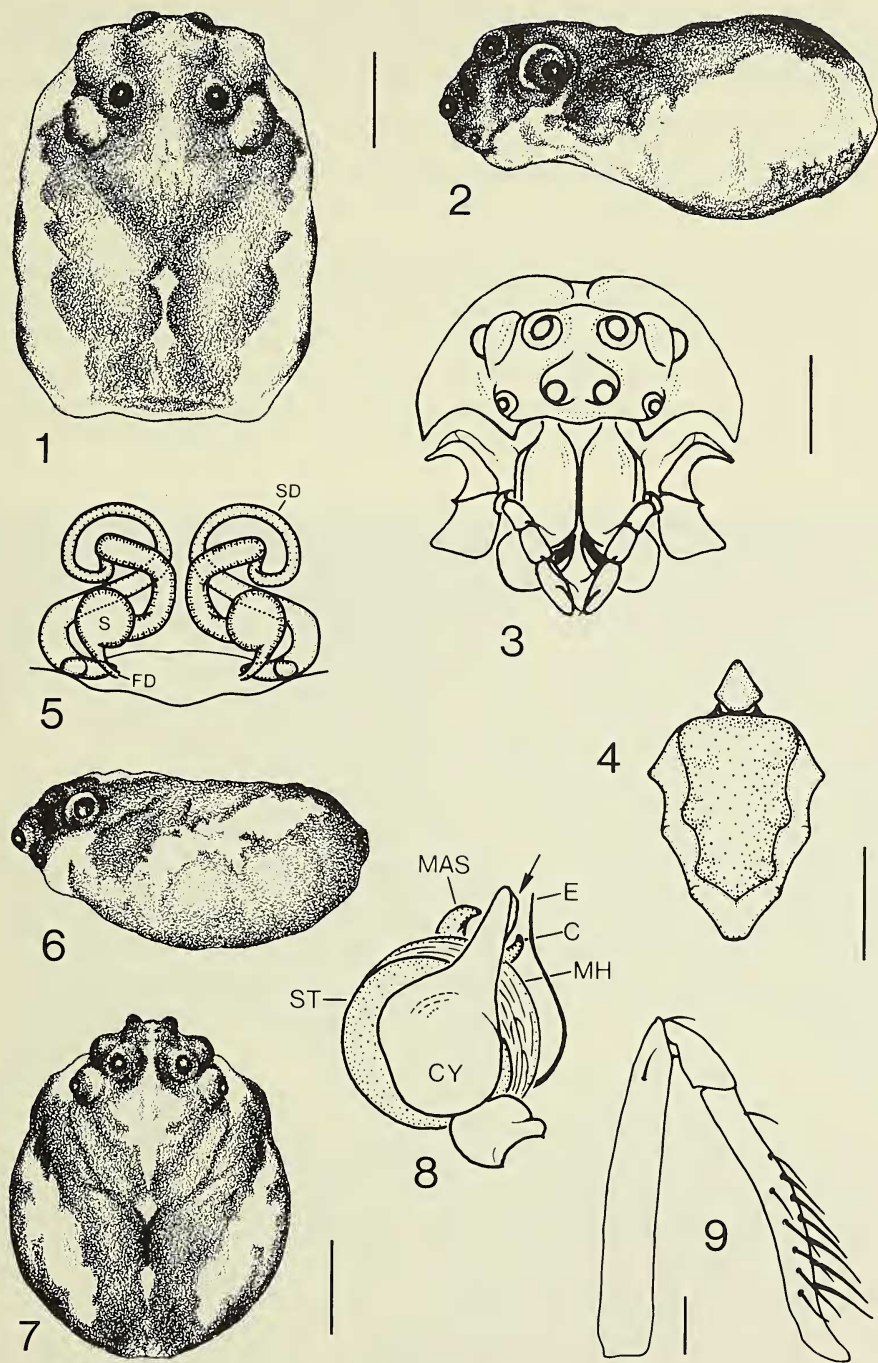
Figs. 1-13

Type.—The type species of this genus is *Lubinella morobensis*, new species. The feminine name is an arbitrary combination of letters denoting the taxon's collector (in lieu of a strict, but preoccupied, patronym).

Diagnosis.—Females are distinguished by the presence of prominent eye tubercles (Figs. 1-3) and a divided, ventral epigynal crypt with a posterior rim that overhangs a depression of the epigynum's posterior plate (Fig. 11). Although *Sybota* and *Orinomana* also have eye tubercles (Opell 1979, figs. 100, 115, 121) their epigynae do not have paired ventral crypts. *Philoponella divisa* Opell has a weakly divided transverse epigynal crypt (Opell 1979, fig. 221) and *Daramuliana* separated longitudinal crypts with a posterior median scape (Opell 1979, fig. 189), but neither taxon has prominent eye tubercles, posterolateral epigynal openings, nor a posteriorly protruding epigynal rim. Males are also distinguished by conspicuous eye tubercles (Figs. 6, 7) and by a palpus which has a narrow cymbial tip (Fig. 8), a small median apophysis bulb, a broad, twisted median apophysis spur, and a triangular, weakly sclerotized conductor homolog (Figs. 10, 11). *Conifaber*, *Purumitra*, and *Zosis* male palpi also have a vestigial conductor (Opell 1979, plates 6-c, 7-c, d; Lubin et al. 1982, figs. 14, 15), but are characterized by a tegular spur not present in *Lubinella*.

Description.—Female. Carapace more rectangular than that of most uloborids, maximum width 0.8 length, width at PLE 0.7 length. Cephalic region slightly elevated and laterally set off from rest of carapace (Figs. 1, 2). All eyes on tubercles. When viewed dorsally both eye rows recurved, anterior so that lines across AME posterior margins passes across ALE anterior margins, posterior so that lines across PME posterior margins passes one-half diameter anterior to PLE foremargins. Clypeus height equal to AME diameter (Fig. 3). Length and posterior width of median ocular area twice its anterior width. Lateral ocular rectangle half as long as wide. Width of endite 0.70 length, of labium 0.95 length. Raised central sternum region with bulge adjacent to each coxa (Fig. 4). Femur I 1.9 carapace length. Total leg length ratio (I:II:III:IV): 1.0: 0.51: 0.37: 0.67. Calamistrum length about 0.34 metatarsus IV length and 1.44 cribellum width. Abdomen without dorsal tubercles or posterior extension. Maximum width and height equal, 0.52-0.66 length. Details of genitalia (Figs. 5, 12, 13) provided in species description.

Male. Carapace suboval, maximum width 0.9 length, width at PLE 0.8 length. Deep thoracic groove. Cephalic region more conspicuously set off than in males of related taxa, but not so abruptly as in female (Figs. 6, 7). Eye arrangement, endite and labium propor-



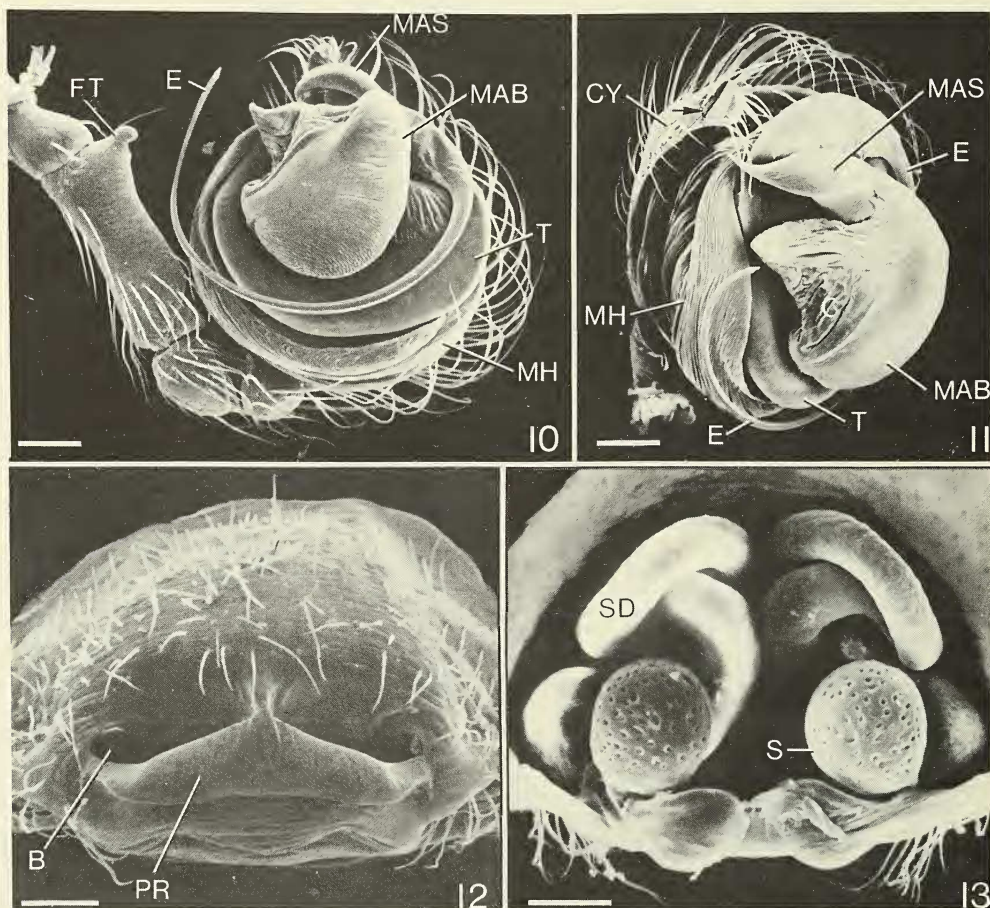
Figs. 1-9.—*Lubinella morobensis*, n. sp.: 1, Dorsal view of female carapace; 2, Lateral view of female carapace; 3, Anterior view of female; 4, Female sternum; 5, Dorsal view of cleared epigynum (FD = fertilization duct, S = spermatheca, SD = sperm duct); 6, Lateral view of male carapace; 7, Dorsal view of male carapace; 8, Prolateral view of male left palpus showing cymbium (CY) with posterior notch (arrow), subtegulum (ST), middle hematodocha (MH), embolus (E), median apophysis spur (MAS), and vestigial conductor tip (C); 9, Prolateral view of male left first femur, patella, and tibia. All scale bars represent 500 μ m.

tions, and sternum similar to female. Femur I 1.7 carapace length. Total leg length ratio: 1.0: 0.51: 0.37: 0.62. Abdomen without dorsal tubercles, maximum width 0.48 length, maximum height 0.40 length. Palpal details (Figs. 8, 10, 11) provided in species description.

Lubinella morobensis, new species

Figs. 1-13

Types.—All from Morobe Province, Papua New Guinea, collected by Yael D. Lubin. Female holotype and paratype from Merri Creek, above Wau, 2100 m elev., collected 10 Dec. 1979. Female and male paratype from Mt. Missim, 1600 m elev., collected 3 Oct. 1979. Female paratype from Wau Ecology Institute, 1200 m elev., collected 11 Mar. 1980. Latter specimen deposited in American Museum of Natural History, others in the Museum of Comparative Zoology. This species is named for the province in which it was collected.



Figs. 10-13.—*Lubinella morobensis* n. sp.: 10, Retrolateral view of male left palpus; 11, Apical view of male left palpus; 12, Ventral view of epigynum; 13, Dorsal view of cleaned epigynum. CY = cymbium (arrow indicates cymbial notch), E = embolus, FT = femoral tubercle, MAB = median apophysis bulb, MAS = median apophysis spur, MH = middle hematodocha, T = tegulum; B = bursal opening, PR = posterior rim, S = spermatheca, SD = sperm duct. All scale bars represent 50 μ m.

Diagnosis.—This species is, at present, the only one recognized in the genus.

Description.—Female. Total length 5.48–6.47 mm ($N = 4$, $\bar{X} = 6.00$), carapace length 2.00–2.14 mm ($\bar{X} = 2.09$), maximum carapace width 1.60–1.74 mm ($\bar{X} = 1.69$). AME, ALE, PME, PLE diameters 160, 105, 200, 200 μm , respectively. Sternum length 1.10–1.24 mm ($\bar{X} = 1.15$). Chelicerae with 1–2 large apical, 1–2 large basal, and 2–3 small median promarginal teeth and 4–5 small median retromarginal teeth. Carapace dark brown with broad lateral white stripes, narrow longitudinal white stripe on thoracic groove, and white PME tubercles (Figs. 1, 2). PME of alcohol preserved specimens with lavender sheen not reported for other uloborids. Sternum tan with brown rim around periphery of raised central region. Legs brown with narrow white ring on distal quarter of femora, proximal margin and center of tibiae, and proximal margins of metatarsae and tarsae. Femur I 3.80–4.16 mm long ($\bar{X} = 3.99$) with 1 prolateral, 1 dorsal, and 1 retrolateral macroseta. Tibia I with 3–4 prolateral, 2 dorsal, and 2 retrolateral macrosetae. Calamistrum 0.74–0.86 mm long ($\bar{X} = 0.79$), composed of 32–40 setae, spaced 20–23 μm apart. Ventral comb 1.58–1.83 mm long ($\bar{X} = 1.74$), comprised of 32–35 tarsal and 5–7 metatarsal setae spaced 42–43 μm apart. Oval abdomen 3.60–4.56 mm long ($\bar{X} = 4.00$). Cribellum 0.53–0.57 mm wide ($\bar{X} = 0.55$ mm). Abdomen light with scattered black pigment forming dark anterior tip and narrow four- or five-lobed dorsal folium. Brown pigment outlines midventral stripe and colors book lungs and anterior epigynal margin. Epigynum with two deep, oval, ventral crypts divided by thin septum (Fig. 12). Each crypt twice as broad as long, with opening at lateral margin which connects to looped sperm duct that increases in diameter and wall thickness near medial connection to spherical posterior spermatheca (Figs. 5, 13). In posterior view epigynum 0.80 as high as broad. Thin, dorsally curved posterior rim forms narrow recess on epigynum's posteroventral surface.

Male. Total length 4.15 mm, carapace length 1.72 mm, maximum carapace width 1.58 mm. AME, ALE, PME, PLE diameters 160, 80, 160, 160 μm , respectively. Sternum length 0.90 mm. Chelicerae with 5–6 small promarginal and 4 very small retromarginal teeth. Carapace dark brown with pair of broad, diverging lateral white stripes, small white spot in and just posterior to thoracic groove, white, median arrow with shaft beginning at AME and tip terminating at thoracic groove; and white patch on either side of lateral ocular area (Figs. 6, 7). PME lavender. Sternum and leg color similar to that of female except metatarsae II–IV light with distal gray ring. Femur I 2.96 mm long, with one prolateral, one dorsal, and no retrolateral macrosetae. Tibia I 2.25 mm long with prominent distal crook, 5 prolateral, 12–13 dorsal, and 2–3 retrolateral macrosetae (Fig. 9). Ventral comb 1.16 mm long with 19 tarsal and 4 metatarsal setae, mean spacing 50 μm . Slender gray abdomen 2.52 mm long with large white hourglass shaped spot in cardiac area posterior to which are large median and three pairs of paraxial white spots. Venter with broad white stripe extending forward between gray book lung covers and becoming laterally darker near spinnerets. Palpal femur with large median and lateral proximal femoral tubercles. Width of distal third of cymbium less than one quarter that of basal region, cymbial tip with posterior groove (Fig. 8, arrow). Median apophysis bulb a small hemisphere with diameter about 0.60 that of tegulum (Figs. 10, 11). Conductor a weakly sclerotized triangular projection. Median apophysis spur thin, twisted, and pointed.

Distribution.—Known only from Morobe Province, Papua New Guinea.

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LITERATURE CITED

- Lubin, Y. D. In press. Web function and prey capture behavior in Uloboridae. *In* Evolution of Spider Webs, W. A. Shear, ed. Stanford Univ. Press, Stanford.
- Lubin, Y. D., B. D. Opell, W. G. Eberhard, H. W. Levi. 1982. Orb plus cone-webs in Uloboridae (Araneae), with a description of a new genus and four new species. *Psyche*, 89:29-64.
- Opell, B. D. 1979. Revision of the genera and tropical American species of the spider family Uloboridae. *Bull. Mus. Comp. Zool.*, 148:443-549.
- Opell, B. D. 1983. A review of the genus *Tangaroa* (Araneae, Uloboridae). *J. Arachnol.*, 11:287-295.
- Yoshida, H. 1980. Six Japanese species of the genera *Octonoba* and *Philoponella* (Araneae: Uloboridae). *Acta Arachnol.* 29:57-64.
- Yosida, H. 1981. Seven new species of the genus *Octonoba* (Araneae: Uloboridae) from the Ryukyus, Japan. *Acta Arachnol.*, 30:21-32.
- Yoshida, H. 1982. Spiders from Taiwan I. Two new species of the genus *Octonoba* (Araneae: Uloboridae). *Acta Arachnol.*, 30:71-74.

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